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Finding The Bess Lemon For Florida . . . A Report of Progress

Part II.

Finding The Best Lemon For FF. Of Florida . . . Use In Frozen Concentrate

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Ziegler Says Post Bloom Period Important In Citrus Pest Control

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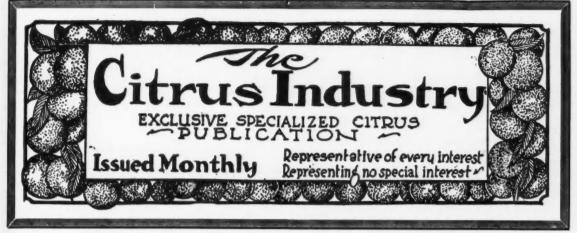
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Finding The Best Lemon For Florida . A Report Of Progress 1,2

Historical

Florida is today the largest citrusgrowing area in the world. Yet oddly enough it has long been dependent on California for its lemons. Florida's average consumption of Calfornia lemons over the past 10 years has amounted to 160,300 boxes annually3. However, this failure to produce lemons sufficient to meet its own needs has not always been true of Florida. In the years before the Great Freeze of 1894-95, Florida

Florida Agricultural Experiment Stations Journal Series No. 816.

The search for the best lemon has been greatly facilitated by Minute Maid Corporation which made substantial contributions that the infant industry might get off to a good start. Especial acknowledgement is due Dr. A. E. Willson who cooperated closely with the author in planning and executing the work in the field. Appreciation must also be expressed for contributions by Libby, McNeill, & Libby which furnished the fruit described under Selections A and B.

3 Calculation based on shipments of lemons into Florida, 1948-57. Data supplied through the courtesy of W. H. Merrill, Chief Quarantine Inspector, State Plant Board of Florida. Gainesville.

Presented at Florida State Horticultural Society Meeting in Clearwater, October, 1958.

I. The Growing of Lemons In Florida: Historical, Varietal, and Cultural Considerations.

By L. C. KNORR FLORIDA CITRUS EXPERIMENT STATION LAKE ALFRED

supplied not only its own population but shipped as many as 140,000 boxes of lemons per season (3)roughly 5 per cent of the citrus then moving out of the State.

But with the Great Freeze, the production of lemons in Florida ground to a stop. Most of the lemon groves, then lying north of where citrus is grown today, were killed by the cold, and Florida iemons disappeared from the nation's tables -both dinner and statistical.

It is true that lemons are more tropical in their temperature requirements than are oranges, grapefruits, and tangerines-but the Great Freeze cannot solely be blamed for the disappearance of Florida's lemon industry. If cold had been the only limiting factor, lemon growers could have moved south and prospered along with the rest of the industry. The Freeze simply triggered a gun that had already been aimed before the Freeze of 1894: Florida's lemon industry was being menaced by competition from California. It is axio-

matic among lemon growers and shippers that the best lemons come from areas of the world that are hot and dry, for only in such areas is there freedom from the fruitblemishing scab fungus, and is there sufficient absence of humidity to facilitate the curing that is so essential for prolonged storage, shipment, and shelf-life. The pessimism among Florida lemon growers that followed the Freeze of 1894 was well expressed by Hume (3) many years ago when he wrote: "In the growing of lemons there is always a double problem, first, the production of high-grade fruit, and then the coloring and curing of it for market. It is questionable whether lemon growing will ever become a stable and profitable industry in any citrus region where scab is prevalent and where the harvesting and curing season is moist."

Florida's recent comeback as the world's leading citrus producer was made possible through a technological advance—the manufacture of frozen concentrated citrus juice. Coupled with Florida's low growing costs, the stimulus provided by the concentrate process has been so great that today Florida sends to market as frozen orange concentrate more oranges than were grown in the State the year this product was first introduced.

With respect to lemons, it is this same technological advance-frozen concentrate—that bids fair to resurrect Florida's old-time lemon industry. Already 3,000 acres of lemons are planted in the State to help supply the nation's demand for frozen lemonade concentrate. With this revolution in the use of lemons. old arguments against Florida-grown lemons lose their pertinence. Commercial juice extractors, without the housewife's pecky concern over external appearances, do not cast out fruits blemished by scab, nor are processors worried about keeping quality of fruits that are juiced upon picking. With scab and keeping quality no longer considerations, efforts can now be directed toward producing lemons that are superior in acid production and in quality of peel oil. And advantage can be taken of what once used to be a source of embarrassment in the fresh-fruit market - the overlarge size of Florida's lemons.

Varietal Considerations

Once it became evident that Florida's low production costs (as compared to California's \$2.22 per box4) could very advantageously supply lemons for frozen concentrate, interest was quickly aroused in the planting of lemons. Among the first problems confronting prospective growers was the question of what variety to plant. One solution was to take advantage of California's long experience in lemon growing by planting varieties found to be successful there-varieties such as the Lisbon and the Eureka. But as with oranges, varieties that grow best in one part of the world do not necessarily do so in another. Another possibility was to revert to varieties once grown and found satisfactory in Florida-principally the Villafranca, the Perrine, and the Meyer. But this recourse offered no assurance that such varieties would be suited to make frozen concentrate, or to make high-grade lemon oil. Rather it seems probable that the Florida varieties, as in the case of those grown in California, were selected in large part out of considerations for small size and hardiness in storage and transit.

In meetings with growers and processors, it was agreed that since the future of lemon growing in Florida now lies with frozen concentrate, the variety to plant is one that would supply the highest yield of acid on an acre basis and the one that would produce the best grade of peel oil. In addition to these two primary requisites, it was recognized that other characteristics are also desirable: ability to produce abundantly, power to resist disease, failure to develop thorns, and possession of such other virtues as are generally required for the successful production of citrus.

A search for varieties of lemons that would embody these require-



DR. L. C. KNORR
The Author

ments was undertaken among lemon trees that are still to be found in Florida-mainly in dooryards, but also in collections of citrus varieties, notably the U.S. Department of Agriculture planting at Orlovista, and the Citrus Experiment Station collection at Lake Alfred. No attempts were made to introduce varieties from California or abroad inasmuch as vegetative parts of citrus are denied entry into the State under existing quarantine regulations. However, it is more than probable, due to nucellar embryogeny in citrus. that California varieties as well as Italian, are represented because many of the seedling trees yielding budwood for these trials were originally grown from seeds out of lemons shipped in from these areas.

To date some 200 selections have been brought together; these are now growing in several commerical plantings where their behavior is being watched under uniform growing conditions. Of these 200 selections there are 40 in one planting that have already grown sufficiently to yield their first crop of fruit. Data on these can now supply a partial answer to the question of what variety should be planted. The figures to follow are those obtained from the experimental planting sponsored by Minute Maid Corporation at Avon Park, Florida.

In presenting these data, it must be borne in mind that results are no more than preliminary. Figures given are based on only the first year's crop, and therefore do not properly indicate the future behavior of the tree or selection. A serious deficiency in the information presented, for instance, is the lack of figures on yield of fruit on a per tree or per acre basis. Also lacking is information on susceptibility to diseases and on longevity of the trees.

The advisability of publishing preliminary findings at this time was roundly debated by industry and research personnel connected with the acid fruits project. The hazards of drawing conclusions from first-year yields were fully appreciated, as was also the danger of seeming to imply recommendations. In the end, however, it was decided to present such data as were already accumulated, for the purpose not of suggesting what varieties to plant but rather to indicate what varieties should not be planted. Certain data are considered reliable at this time and will change little with the testing of succeeding crops. This is particularly true with figures pertaining to peel-oil analyses. However, the ultimate decision regarding the best lemon to plant cannot be reached until some time in the 1970's, for it will take 15 years or more to evaluate such factors as susceptibility to shell bark disease.

Field Layout .- Budwood from 40 selections of lemon trees growing in various parts of Florida were assembled in the summer of 1954 by the writer in cooperation with Dr. A. E. Willson of Minute Maid Corporation, Orlando, Florida. To secure results in the shortest time possible, selections were topworked to 30-year-old seedy grapefruit trees on rough lemon roots. By means of topworking, it was possible to obtain fruit to the extent of two boxes a tree at the end of the third year from budding. Thirteen trees were budded to each selection to provide the amount of fruit needed to evaluate juice and oil characteristics under commercial conditions.

The planting, located on Minute Maid property in Avon Park, con-(Continued on page 9)

⁴ Based on all costs for an average 10-acre grove, comprising 30-year-old trees planted 90 trees to the acre and yielding 450 California field boxes to the acre (1).

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FINDING THE BEST LEMON FOR FLORIDA . . A REPORT OF PROGRESS (Continued from page 6)

sisted of a rectangle containing 40 rows of 13 trees spaced 25 x 30 feet apart. Lay of the land may be described as falling rather steeply from high ground at the west end (Row No. 1) to Row 11; lying more or less flat from Row 12 to 30; and descending gently from Row 31 to 41. Visual inspection indicated a general uniformity in the type of soil—a Lakeland sand. All cultural practices were alike throughout the entire block. Row 1 served as a from high ground at the west end Row 41 on the east end.

Two lemon selections, other than the 40 mentioned above, were also used in the preparation of concentrate for lemonade and for the extraction of oil. However, these (designated A and B) were not grown in the Avon Park plot but were raised elsewhere in the State and were harvested and delivered to the Station in bulk by Libby, McNeill, & Libby of Ocala, Florida.

Description of Selections.—Names given to selections listed in Table 1 are variously designations under which varieties are carried by nurs-

erymen (e.g., Glen St. Mary's Harvey, Ward's Avon), designations given by owners of dooryard trees, or designations arbitrarily affixed by the author. Undoubtedly, many of the 40 selections, when grown under identical conditions, will turn out to be one or another of such old-time varieties as Villafranca, Eureka, or Lisbon. Others, perhaps those presently listed under the names Villafranca, Eureka, and Lisbon in Table 1, may turn out to be hybrids for it is not infrequent to find owners who regard as a Lisbon any tree that has grown out of seed from a Lisbon lemon. The true identities of these selections will probably not be known for years, and will require much timeconsuming taxonomic work. Since, however, the identity of these lemons is of less importance than the determination of which one will make the best lemonade, or produce the best lemon oil, taxonomic considerations are being deferred until the worst of the selections have been eliminated.

Only a few words need be said at this time concerning antecedents of each selection; these are presented in Table 2. Additional details are on file and are available to those interested.

Therniness.—Only such descriptive material is given in Tables 1 and 2 as may assist in the acceptance or rejection of selections. Thus, for example, information on degree of thorniness is presented because length of spine correlates roughly with cost of picking. Values given are those for parent trees. Nearly all trees at the Avon Park planting developed thorns, but much of the thorniness was undoubtedly due to the juvenile stage of the tree's growth; normally such thorniness subsides in time to the degree found originally in the parent trees.

Cold Susceptibility. - Interesting in a consideration of cold susceptibility is the fact that the land on which these lemons were grown slopes down not only from west to east but also from south to north. Thus, both row and tree position effects could be observed in relation to the severe freezes of 1957-58. The foliage and wood of most selections escaped unharmed, a few showed intermediate degrees of damage, and one selection (No. 25) was killed outright. The reaction in each case was uniform throughout the 13 trees of each selection.

Yields. — In harvesting the first crop for processing, the objectives (Continued on page 12)

Table 1. Resume of data covering 43 selections of lemons topworked to 30-year-old seedy grapefruit trees in the summer of 1954, Avon Park, Florida, and harvested October through December, 1957. Each variety is represented by fruit from 13 trees

1			Perc	entage	es of	fruits	in e	ach s	ize*		Jo of	te			eactions ected)		to
No.	Selection name	42.	90 93	. 250	216	200	176	, 150	, 126	, 100	Avg. no. seed per fruit	rg. no. of	Scab	Russet %	Rumple %	Boxes picked by CES	Cold leceptibility 0-None to
		No.	No	No	No	Zo.	No.	No.	No	No.	4"	Avg	-	R	Ru		ene
1	Avon Commercial	12.1	22.1	26.3	19.3	14.2 15.4	4.9	0.9	0.2	=	17	11	25	14	trace	10	1 0
. 1	Perkin	13.3	16.7	23.1	15.9	13.6	17.1	7.4	1.5	0.2	111	10	14	9	3	15	0
. 1	Harvey No. 3	11.1	14.5	22.7	23.1	16.8	9.8	2.2	1.0	0.1	16	10	10	12	13	15	0
-1	Avon No. 3	10.8	13.9	24.6	19.9	15.4	11.0	2.0	1.0	0.1	15	10	7	6	3	15	0
1	Cowgill No. 2		14.5	23.1	21.4	18.5	9.8	2.3	0.6		16	10	10	6	trace	18	0
1	Avon No. 1	9.8	22.7	20.0	11.3	6.5	2.8	0.7	0.2	0.1	2	10	111	19	trace	14	0
-1	Harvey No. 1	35.7 25.4	25.4	26.3	14.2	6.2	1.7	0.5	0.2	0.03	9	11	21	7	trace	18	0
-1	Bearss No. 1	13.3	15.5	22.0	20.3	16.8	8.4	2.8	0.8	0.04	12	10	17	8	4	18	0
1	Avon No. 2	42.0	19.8	19.3	11.3	4.6	2.2	0.6	0.1	0.1	3	9	9	18	trace	13	0
1	Harvey No. 2	22.9	19.7	24.9	16.1	11.6	3.6	0.9	0.3	-	5	10	49	5	0	18	0
1	Bearss No. 2	4.5	7.3	15.9	19.5	24.2	15.4	9.4	3.5	0.3	12	10	31	10	1	18	0
1	Hogsette	5.8	7.6	18.0	19.6	23.5	14.4	7.5	3.3	0.3	15	10	57	3	trace	17	0
1	Carney	6.4	7.8	19.5	18.9	23.6	15.0	6.6	2.0	0.2	12	10	41	8	1	18	0
1	Moreland	8.5	11.0	21.3	22.1	20.8	10.2	4.8	1.2	0.03	6	10	46	6	4	18	0
1	Schultz	7.2	8.9	17.9	21.0	24.3	12.8	6.4	1.3	0.2	8	10	45	11	14	18	1
1	Edwards	6.6	7.4	18.1	21.9	24.0	12.9	7.3	1.8	0.03	12	10	54	4	3	18	2
-1	Lisbon (USDA)	7.5	11.4	18.6	16.6	21.9	13.8	7.1	2.7	0.4	1	9	35	4	2	7	0
1	Eureka (USDA)	6.5	6.2	14.1	16.7	23.9	18.2	10.2	3.8	0.4	20	10	66	3	6	18	1 2
-1	Corregia Cowgill No. 1 (USDA)	10.0	7.9	17.6	16.7	23.5	14.2	6.7	3.2	0.2	7	10	5-6	6	3	18	2
- 1	Des 4 Saisons (USDA)	7.4	15.7	25.6	20.9	21.1	6.7	1.9	0.6	0.1	14	10	70	5	3	18	1 1
- 1	Mexican (USDA)	7.2	5.4	15.5	15.3	23.9	18.5	10.2	3.6	0.4	18	9	69	3	1	18	1 2
- 1	Bernia (USDA)	21.4	10.4	19.3	16.4	19.5	7.5	4.5	1.0	0.04	5	10	86	8	0	18	3
1	Kusner (USDA)	8.1	9.9	15.4	16.9	23.5	14.6	7.8	8.4	0.4	12	10	60	6	1	1 18	1 2
1	Sturrock	13.9	18.6	31.3	22.6	9.9	2.2	0.9	0.3	0.3	80	12	4	9	0	3	1 4
1	Italian	2.9	4.1	11.8	18.3	27.8	21.7	11.8	1.7	0.4	18	9	5.6	7	0	14	0
1	"M" Lemon	8.2	12.6	23.3	23.5	18.9	8.8	3.4	1.2	0.1	11	10	57	8	0	14	0
1	Arizona	4.6	6.1	16.3	18.5	25.3	16.9	9.5	2.3	0.5	11	10	54	- 4	0	14	0
	Murray	10.1	10.5	20.5	20.3	22.2	11.2	4.5	0.5	0.8	5	10	65	3	trace	14	0
1	Bergametto (USDA)	6.3	6.1	16.3	15.5	21.7	17.4	13.4	1.7	0.4	5	9	66	5	0	14	0
1	Villafranca (CES)	2.8	4.9	14.1	17.6	20.0	19.6	3.7	0.6	0.4	16	10	77	4	0	14	0
ì	Shinn (CES)	20.0	16.5	21.0	17.7	15.5	19.6	14.2	0.6	1.1	4	9	- 32	30	0	7	0
1	CES III G-5	3.1	3.7	15.2	14.1	28.4	8.5	7.0	1.3	0.2	10	10	72	5	0	14	0
1	Brenham (CES)	19.2	13.5	19.0	15.8	15.5	11.5	4.8	0.3	0.06	9	10	53	6	2	14	0
-1	Sicily (CES)	7.9	9.3	21.3	21.6 16.9	17.8	10.8	6.7	2.2	0.4	5	10	73	3	0	10	0
. 1	Sexton No. 1	9.9	17.3	18.0	21.4	20.2	9.1	4.1	0.6	0.1	6	11	60	i	1	14	0
- 1	Sexton No. 2	9.7	12.6		18.7	21.1	9.5	4.2	0.03		15	10	61	2	trace	14	0
1	Villafranca (W. Park)	8.7	15.2 8.7	22.6 15.7	17.8	24.6	15.8	11.3	1.3	0.5	16	9	61	3	11	14	0
. 1	Parman	4.3		23.6	20.2	23.1	9.1	3.4	0.8	0.03	9	10	43	1	1		
. 1	Eustis	5.9	13.9	20.0	40.4	MO. A	2.4	3.7				20	40	7	4	14	0

^{&#}x27; Underlined values represent the modal class, e.g., the class into which the greatest number of fruit fall.

Dr. Ziegler Says Post Bloom Period Is Important For Control of Citrus Pests

The post-bloom period of citrus trees is the most important for the control of the fungus disease, melanose, and rust mite, says Dr. L. W. Ziegler, professor of fruit crops with the University of Florida College of Agriculture.

The post-bloom period usually occurs in late March and early April. At that time the petals have dropped and small set fruit is present.

Severe melanose infections on fruit are referred to as "mud-caking," due to the resemblance to muddy soil. Rust mite discoloration is called sharkskin or buskskin because of its substantial similarity to these.

The usual post-bloom spray contains a neutral copper compound for control of melanose and a wettable sulfur for rust mite control. Dr. Ziegler says any commercial brand of these materials is satisfactory.

Distribution of the spray is important. It should be applied as a "slow outside cover." Dr. Ziegler explains that the entire tree should be covered. Pressure should be approximately 500 pounds per square inch, giving the spray entrance through the branches but not injuring the fruit or leaves.

Spray should be applied from one to three weeks after petal drop. The citrus grower may control other problems at the time of the post-bloom spray. The copper compound used against melanose will also furnish the esential element for nutritional purposes. Other nutrient elements such as zinc, manganese, and borax may be added. Dr. Ziegler says any of these nutritionals can be applied in various compounds and can be mixed with the melanose-rust mite spray at manufacturer's dosage recommendations.

Grapefruit growers may add arsenate of lead to hasten maturity. This can be done at dosages of 0.4 to 1.25 pounds per 100 gallons of spray mixture, according to conditions. Arsenate of lead should not be used on any variety except grapefruit.

MINUTE MAID HANDLES BIG JOB IN FROZEN CITRUS CONCENTRATES . . .

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FOR FLORIDA . . A REPORT OF PROGRESS

(Continued from page 9)

were to determine yield of juice from fruit, acid content in juice, flavor of juice, and peel oil characteristics. Once these led to an elimination of undesirable selections, time could be given to measur-

FINDING THE BEST LEMON ing the amount of fruit produced. It was felt also that yield records based on a first year's crop would not be a reliable index of production since many of the trees were not yet at equilibrium.

> However, some indication of selections that gave poor yields can be obtained from the column headed "Boxes picked by CES" in Table

1. With most varieties it proved. easy from among the 13 trees per selection, to secure the 14 to 18 boxes needed for processing. Any rows that yielded less than the 14box minimum did so because the 13 trees bore insufficient fruit. Particularly poor yielding selections were Nos. 7, 18, 25, 32, and 35. On the other hand, most of the

Table 2. Antecedents and growth characteristics of parent lemon trees from which budwood was obtained for the Avon

Selection No.	Designation	Location of parent trees(s)	Seedling or budded trees(s)	Age (yrs.) of parents (1)	Degree of thorniness (2)	Amount of shell bark (3)	No. trees supplying budwood	Notes
1.	Avon, Commercial	Loxahatchee	В	4	+	•	+25	Budwood from various trees in a commer- cial grove. Selection 1 is a buffer row. Fruits were harvested to provide trial run of procedures and machinery. For proper evaluation of Avon, see Selections 4, 6, and 9.
2.	Perkin	7	?	?	?	?	?	Parent(s) not seen.
	Harvey No. 3	Winter Haven	В	3	+	•	30	For description of the Harvey lemon, see catalog of Glen St. Mary Nurseries. See also Selections 7 and 10.
4.	Avon No. 3	Avon Park	S	25	+++	1	1	A commercial variety currently being propagated by Ward's Nursery, Inc. See also Selections 1, 6, and 9.
5.	Cowgill No. 2	Oriovista .	В	20	7	2	1	Variety is said to have originated in Arizona. At one time propagated by Cowgill Nursery, Tampa. See also Selection 20.
6,	Avon No. 1	Loxahatchee	В	4	+	•	1	See also Selections 1, 4, and 9.
7.	Harvey No. 1	Loxahatchee	В	4	+		1	See also Selections 3 and 10.
8.	Bearss No. 1	Tampa	В	60	+	2	1	This variety is also called Sicily and Sicilian, but these names have been used capriciously, and do not necessarily indicate a relationship to the lemon of the same name that at one time was grown commercially in California. See also Selections 11 and B.
9.	Avon No. 2	Loxahatchee	В	4	+	•	1	See also Selections 1, 4, and 6.
10.	Harvey No. 2	Loxahatchee	В	4	+	•	1	See also Selections 3 and 7.
11.	Bearss No. 2	Tampa	В	60	+	2	1	See also Selections 8 and B.
12.	Hogsette	Plymouth	S	12	+	2	1	
13.	Carney	Weirsdale	S	60	++	3	1	
14.	Moreland	Glenwood	В	12	+	2	1	
15.	Schultz	Auburndale	В	16	+	2	1	
16.		Lakeland	В	10	0	2	1	Original budwood said to have come from Arlzona.
17.	Lisbon	Orlovista	В	20	++	2	1	
18.	Eureka	Orlovista	В	20	+	2	1	Recorded as the Shamel strain, and intro- duced from California.
19.	Corregia	Orlovista	В	21	+	2	1	An introduction from French Morocco.
20.	Cowgill No. 1	Orlovista	В	20	+	2	1	One of 2 selections as described under Selection 5.
21.	Des 4 Saison	Orlovista	В	21	++	2	1	An introduction from French Morocco,
22.	Mexican	Orlovista	В	16	+	2	1	An introduction from Mexico.
23.	Bernia	Orlovista	В	21	+	2	1	An introduction from French Morocco.
24.	Kusner	Orlovista	В	21	+	2	1	An introduction from Russia.
	Sturrock	W. Palm Beach	В	1	?	*	10	
26.	Italian	?	В	1	?	•	Several	Original source of budwood was a seedling tree planted 36 years ago from seed from Italy.
27.	"M"	Winter Garden	s	30-50	+	2	1	
28.	Arizona	Clermont	В	20	+	2	1	Said to be an introduction from Arizona.
29.	Murray	Fort Worth	S	7	+++	•	1	
30.	Bergametto	Orlovista	В	8	+	1	- 1	

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31.	Villafranca (CES)	Lake Alfred	В	20	+	3	1	Parent is a tree that was topworked with budwood from a seedling that was supposed to be a cross between Villafranca lemon and Philippine lime, but it is apparent that the original budwood must have comfrom a nucellar rather than from a gametic seedling of Villafranca since neither fruit nor foliage suggest the presence of lime blood.
32.	Shinn	Lake Alfred	В	20	+	3	1	Same remarks as under Selection 31 except that Shinn replaces Villafranca.
33.	CES III G-5	Lake Alfred	В	20	+	3	1	Source unknown,
34.	Brenham	Lake Alfred	В	. 20	0	3	1	Originally from Brenham Grove, Haines City.
35.	Sicily (CES)	Lake Alfred	В	20	++	3	1	Information is lacking to say whether this lemon is the same as the variety of the same name once grown in California, or whether it is related to the Bearss.
36.	Sexton No. 1	Avon Park	В	5	+			Source unknown,
37.	Sexton No. 2	Avon Park	В	5	+++	*		Source unknown.
38.	Villafranca (WP)	Winter Park	В	36	+	2	1	Original budwood said to have come from California in 1917.
39.	Parman	Goulds	?	12	+	2		
40.	Eustis	Eustis	В	2	+	•	10	Original budwood from a 20-year-old seed- ling showing no shell bark. A variety being propagated by Grand Island Nurse- ries.
A. B.	Meyer Sicilian	selection r	ot grown earing th	n at A	von Par it known	k. Fr	uit contr	contributed by Libby, McNeil & Libby. This ributed by Libby, McNeil & Libby. Budwood from various 60-year-old trees in the Bears

(1) At time of collection of budwood; approximate.
(2) 0-none, +-short, sparse, ++-moderately long, frequent, +++-long, many. Significance of these values depends on age of tree; the older the tree, the less juvenility is operative and the less apt thorniness is to decrease.
(3) 0-none, 1-little, 2-moderate, 3-much. Significance of these values depends on age of tree; since shell bark does not appear until trunks are 6 or 7 years old, the values given are significant only in the case of older trees.

*Indicates absence of shell bark, but probably due to youth of tree and not to innate freedom.

Undetermined

other selections yielded as many as 3 boxes of fruit per tree.

It should be emphasized at this point that no final decision regarding lemons best suited to Florida's needs can be made until acid and peel oil yields can be expressed in terms of yield per acre; this cannot be done until reliable production data are available. Some further information on yield per tree will be available within the next two months.

Disease Reactions .- In the past scab has had a marked effect on Florida-grown lemons (4)-and results from the present trials show that the scab organism still has not lost its punch. In half the selections, over 50 per cent of the fruit was scabby. In one variety, No. 23, 8 out of every 10 fruits were affected. On the other hand, a few varieties (Nos. 4, 5, 6, 10, and 25) showed relatively slight scabbing. The presence of scab, however, would not prejudice a selection in the eyes of a processor, and even if varieties are discovered that are suitable for the fresh-fruit market, the newer fungicides ought to make it possible to protect Florida lemons from the scab fungus.

Russet, or silver scurf, has long been another serious blemish of Florida-produced lemons (4), and its presence was again to be seen in fruits raised in this trial. Percentages of affected fruits among the selections tested ranged from 1 to 30 per cent. But here, too, as in the case of scab, the blemishing aspect of russet is of no concern to the processor-though russet will depress yields (2). The newer controls for russet in other citrus fruits should correct this shortcoming in Florida-grown lemons.

Rumple is a tentative name given to an as yet unidentified disease that appeared among lemon fruits in this planting. Symptoms consist of a brown oleocellosis-like settling of the rind. In many instances this pattern involved as much as 30 per cent of the surface of the fruit. Some varieties showed none of this trouble; at the other extreme, three varieties showed between 10 an 14 per cent damage. While affected fruits presented a grievous appearance, there was no evidence of offflavors in lemonade made from them. This disease needs further study to assess its importance.

Shell bark, a limiting disease of lemons in nearly all parts of the world, cannot be evaluated at this early stage. The scaling of bark along the trunk does not appear usually until trees are 6 or 7 years old. Proper evaluation of shell bark will require a special planting where budded trees are employed-not, as in the Avon Park planting, where selections were topworked on trees that were 30 years old and that undoubtedly contained an assortment of viruses.

Seeds and Segments. characterization of each selection may be obtained from numbers given in Table 1 on seeds and segments per fruit. Counts are based on random selections of 10 fruits per variety. Calculations show that the standard deviation of seed counts ranges from 0.8 to 11.5, and that the S. D. of segment counts varies from 0.01 to 1.5.

Fruit Sizes .- Sizes of lemons were obtained by passing fruits over the grading belt in the packinghouse. Size intervals were those ordinarily used to size oranges. It will be noted that when grown to maturity, Florida lemons are much larger than California lemons which are harvested when green and are picked for smallness of size. Sizes obtained in the Florida study by allowing fruits to grow to maximum size were 100, 126, 150, 176, 200, 216, 250, 288, and 324 with most fruits falling between 200 and 250. These sizes, based on Florida's 1-3/5 bushel shipping box, are larger than sizes customarily used in marketing California lemons.

Harvesting. - As mentioned, the harvesting of fruits from the Avon Park trials took place when most fruits had attained maximum size. Because of the length of time needed to process each selection separately, the harvesting operation was spread out over a two-month period. Five selections were picked weekly start-

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ing with Selections 1-5 on October 14, and ending with Selections 36-40 on December 16, 1957. This sequence of dates introduced the possibility that the 40 selections would not yield comparable results because of differences in maturity. To determine magnitude of possible variations, records were kept to discover whether, over the two-month period, changes took place in the percentage of acid in the fruits. Results are presented under appropriate places in succeeding papers of this series.

Discussion

In concluding this section on the problems and results obtained in searching for Florida's best lemon, it would be most helpful to recommend a particular variety for planting. However, no such recommendation can be made at this stage in the testing program. It takes years to determine what selections are best, but in one year's time much can be learned about what varieties are worst. If prospective lemon growers can be warned against planting selections that are inferior, then publication of these data is justified.

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EXTRA CIPHER CREATES ERROR IN HUFF ARTICLE

Paul B. Huff, whose article relative to Fluorine Air Pollution appeared in the March issue of The Citrus Industry, calls attention to an error in the manuscript submitted stating that "200,000 acres of citrus groves in West Polk County was being damaged in some degree." Mr. Huff states that the figure in his manuscript should have been 20,000 instead of the larger amount appearing in the printed article.

The variety meats—liver, kidney and heart — provides vitamin B6. Beef, pork, lamb and veal muscle meats also supply this vitamin, which functions in amino acid and fatty acid metabolism.

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PART II

Finding The Best Lemon For Florida ... A Report Of Progress

Grower interest in the production of lemons in Florida has increased since the introduction of frozen concentrate for lemonade about 1949. Some fruit and juice characteristics of Florida lemons have been discussed previously (5) as have some of the possibilities for the future production and utilization of lemons in Florida (6). The growing of lemons in California and other citrus areas the world are extensively discussed by Batchelor and Webber (3) and the fruit and juice charateristics of California lemons are summarized by Bartholomew and Sinclair (2).

Frozen concentrate for lemonade is produced in both Florida and California in accordance with specifications of the Agricultural Marketing Service, United States Department of Agriculture (7). This product contains essentially lemon juice and sugar with added lemon oil or concentrated lemon oil for intensification of flavor; also, water may be added in sufficient quantities to standardize the product. Using a 6 ounce can of this product, the consumer makes one quart of lemonade by the addition of water. From one gallon of lemon juice approximately 1-1/2 gallons of concentrate for lemonade may be produced, which can then be used to make about 8 gallons of lemonade.

Cole (4) discussed the production of frozen concentrate for lemonade in California, where the pack for the 1956-57 season was over 11 million gallons (1). In comparison with this, Florida production is currently very small. The sale of frozen concentrate for lemonade is very seasonal with over 60 per cent of the pack being sold during the months of June, July, and August (1). Although lemon trees in Florida will bear some fruit throughout most of the year, the crop for processing would probably be harvested during October, November, and De-

Cooperative research by the Florida Citrus Experiment Station and the Florida Citrus Commission. Florida Agricultural Experiment Station Journal Series No. 817.

Presented at Florida State Horticultural Society Meeting in Clearwater, October, 1958. II. Use of Florida Lemons In Frozen Concentrate For Lemonade

By

F. W. WENZEL, R. W. OLSEN, R. W. BARRON, R. L. HUG-GART, ROGER PATRICK and E. C. HILL

FLORIDA CITRUS EXPERIMENT STATION LAKE ALFRED

cember and, therefore, the lemon juice, lemon juice concentrate, or concentrate for lemonade will have to be frozen and stored for considerable periods of time.

The two factors of utmost importance in the production of lemons for use in processed lemon products are flavor and yield of acid. The juice must have a typical lemon flavor that is acceptable to consumers. The yield of acid is dependent upon many factors, including fruit variety and maturity, juice yield obtained from the fruit, and the acid content of the juice. Peel thickness, seediness, and size of fruit influence yield of juice. Of utmost economic importance to the grower is the amount of acid produced per acre, since acid content could be used as a basis for the price of lemons sold for processing.

The purpose of this portion of this study was to determine if the flavor of the lemon juices, extracted from the 42 selections of Florida lemons, was satisfactory; also, to determine the relative yields of acid, expressed in pounds per box, obtainable from these 42 lots of fruit.

Extraction and Examination of Lemon Juices

The quantity of lemons delivered to the Station pilot plant for processing ranged from 3 to 20 boxes, with 36 lots consisting of 12 boxes or more. Each lot of fruit was washed, weighed, and then the juice extracted. Too much astringency and bitterness were evident in the juice obtained from Selection No. 1 due to the use of excessive pressure during the extraction and finishing of this juice. Modifications in these procedures were immediately made

to eliminate these defects. Lemon juices and oil emulsions were obtained from all of the other lots of lemons in the following manner. A Food Machinery In-Line Juice Extractor was used, which was equipped with 3-inch oil cups, 0.04-inch strainer tubes, 7/16-inch restrictors, 5/8inch split rings, and short upper cutters; the extractor was operated at 50 r.p.m. and the beam setting was flush. The rate of water flow to the sprays was always adjusted by the same valve setting of one and one-half turns; in this manner, the proportion of water to fruit used remained fairly constant. The oil emulsion from the extractor was collected and processed further as described in Part III. The juice from the extractor was finished using a Model 35 Food Machinery screw-type finisher, equipped with a 0.027-inch screen and operated with a head clearance in the range of 0.008 to 0.012 inch. The volume of juice obtained from each lot of fruit was measured and the total acid in the juice was determined by titration with standardized sodium hydroxide solution. Processing of the lemons extended from October 14 to December 17, 1957.

Data obtained from the examination of the 42 lemon juices are presented in Tables 1, 2, 3, and 4. Total acid is reported as grams of anhydrous citric acid in 100 milliliters of juice and yield of juice in gallons per 90 pound box of friut. Also listed is the yield of acid, calculated as in the following example, which takes into account both juice yield and percentage of acid.

5.26 g./100 ml. x 5.30 gal./90 lb.box 0.02642 gal./100 ml. x 453.59 g./lb.

= 2.33 lb./90 lb. box

The total acid in the lemon juices ranged from 5.16 to 6.41 g./100 ml.; the yield of juice from 3.76 to 5.80 gal./90 lb. box; and the yield of acid from 1.69 to 2.76 lb./90 lb. box. Thus it is evident that the yields of both juice and acid vary considerably. The highest 10 values found for each of these characteristics are indicated in Table 1. Production data were not available for the 42 lemon selections used in this study and, therefore, the yield of acid per acre could not be determined, although it is an important economic factor

as previously indicated. Such infomation should be obtained as soon as possible in order to properly choose lemons for future plantings.

Since both the juice yield and the acidity increase in lemons as the fruit matures, it is desirable to know when maximum values occur so that the fruit may be harvested. if possible, at such a time. A small sample of approximately 25 fruit was obtained from each of 40 of the lemon selections on September 30 and another sample on November 12 and the acidity in the juices extracted from these samples was determined to see if it was changing. Results showed that the acid content in the juice from only three of the selections decreased 0.2 per cent or more during this short period of approximately two weeks; the acidity increased 0.2 per cent or more in 19 instances and was found to be about the same in the juice from 18 of the selections. The variation in the acid content of the juices extracted from October 14 to December 17, inclusively, as shown in Table 1. was in most instances similar to that found in the juices extracted on November 12 from the 40 small samples of fruit.

Preparation and Examination of Frezen Concentrates for Lemonade

Concentrates for lemonade were made using juice from each of the added to the juice to obtain a Brixto-acid ratio in the concentrate in the range of approximately 15:1 to 16:1. The batch of sweetened juice was divided into three portions, one of which was immediately canned and frozen. Coldpressed oil of lemon, prepared as described in Part III from the same lot of fruit used for the concentrate, was added to the second portion of the sweetened juice, and a folded or concentrated oil of lemon, supplied by Minute Maid Corporation, was added to the third portion. Both types of lemon oil were added on the basis of one milliliter per gallon of concentrate. All products were packed in 6 ounce cans, frozen and stored at -8° F.

The initial flavor of each of the 126 concentrates prepared was evaluated by tasting the lemonade made by the addition of distilled water to each of the three packs containing juice from each of the 42 lemon selections. The effect of storage for one year at -8° F, on the flavor of these concentrates has not yet been determined. Persons who evaluated the initial flavor were requested to indicate if the products had a typical lemon flavor, and if any off-flavor were detectable. Four of the lemonades, in their opinion were acceptable.

A slightly different flavor char-42 lemon selections. Sugar was acter was obtained in the concent-

Table 1. Yields of juice and acid from Florida lemons.

	extracted processed	Selection number	Acid as citric g./100 ml.	Juice yield gal./90 lb. bex	Acid yield lb./90 lb. box
Oct.	14, 1957	1	5,26	5.30	2.33
	16	2 3	5.58	6.15	2.42
	15	3	5.33	5.03	2.21
	17	4	5.60	5.41*	2.54
	18	4 5	5.73	5.43*	2.61*
	21	6 7 8 9	5.75	5.27	2.53
	22	7	5.16	5.62*	2.42
	23	8	5.84	5.09	2.49
	24	9	5.68	5.60*	2.63*
	25	10	5.31	5.45*	2.40
Nov.	4	11	6.00	4.94	2.47
	5	12	5.78	5.12	2.46
	6	13	5.70	4.50	2.16
	7	14	5.76	5.27	2.53
	8	15	5.55	5.39	
	12	16			2.48
	15	17	5.40	5.17	2.33
	10		5.77	4.62	2.22
	14	18	5.44	4.55	2.05
		19	5.46	4.64	2.13
	20	20	5.84	5.64*	2.76*
	21	21	5.92	5.07	2.48
	22	22	5.88	4.87	2.39
	25	23	5.34	3.76	1.69
	26	24	5.77	4.24	2.04
	27	25	6.41*	4.28	2.27
Dec.	2	26	5.56	5.01	2.30
	3	27	6.31*	4.96	2.63*
	4	28	6.14*	5.41*	2.76*
	5	29	6.10*	5.18	2.64*
	6	30	6.08*	4.82	2.46
	9	31	6.13*	4.65	2.37
	10	32	5.82	5.40*	2.65*
	11	33	6.40*	4.82	2.55
	12	34	5.99	5.02	2.51
	13	35	6.07*	5.05	2.58*
	16	36	6.16*	4.79	2.44
	17	37	5.88	4.79	2.35
	17	38	5.94	1.77	2.39
	17	39	5.60	4.40	
	17	40		5.12	2.07
N.T.	19		6.01° 5.54	5.80	2.56*
Nov.		AB	5.51	5.48*	2.67*
	19	В	0.01	0.48*	2.52
	Minimum		5.16	3.76	1.69
	Maximum		6.41	5.80	2.76

^{*} Indicates the 10 largest values.

rates to which the folded oil of lemon was added than that found in the products containing coldpressed lemon oil; however, this slight difference in flavor was not considered to be of any consumer significance.

All of the concentrates for lemonade, except those from two of the

Table 2. Frequency distribution of total

Acid as citric g./100 ml.	Number of samples	% of samples
5.00-5.24	1	2.4
5.25-5.49	7	16.7
5.50-5.74	10	23.8
5.75-5.99	13	30.9
6.00-6.24	8	19.1
6.25-6.49	3	7.1
Totals	42	100.0
Range = 5.16 t	o 6.41 g./100	ml

Table 3. Frequency distribution of yield of juice from Florida lemons.

Juice yield gal./90 lb. box	Number of samples	% of samples
3.753.99	1	2.4
4.00-4.24	1	2.4
4.25-4.49	2	4.8
4.50-4.74	5	11.9
4.75-4.99	8	19.0
5.00-5.24	11	26.2
5.25-5.49	10	23.8
5.50-5.74	3	7.1
5.75-5.99	1	2.4
Totals	42	100.0

Range = 3.76 to 5.80 gal./90 lb. box

Table 4. Frequency distribution of yield of acid from Florida lemons.

Acid lb./90	yield lb. box	Number of samples	% of samples
	0-1.79	1	2.4
	0-1.99	5	11.9
2.2	0-2.39	10	23.8
	0-2.59	18	19.1
		40	100.0

Totals Range = 1.69 to 2.76 lb./90 lb. box

lemon selections, when judged on the basis of flavor were found to be acceptable since they had a typical lemon flavor and no off-flavors detectable. As previously were mentioned, the concentrate prepared from Selection No. 1 was excessively astringent and bitter because of excessive pressure used during the extraction and finishing of this juice. An off-flavor was detectable in the sweetened juice made from the Meyer lemons, Selection A, and this undesirable flavor was intensified when coldpressed Meyer oil of lemon was added to the sweetened juice. This confirmed previous reports from several commercial plants that certain precautions have to be taken if the juice from Meyer lemons is to be used in frozen concentrates for lemonade, to prevent the presence of a non-typical lemon flavor in the product. Since this off-flavor may be removed from the juice by vacuum concentration, it is apparently caused by a trace of Meyer lemon oil which becomes mixed with the juice during

(Continued on Page 21)

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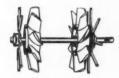




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New Citrus Land Project In Experimental Stage

A land reclamation project designed to turn phosphate spoil banks into bearing citrus groves, was unveiled by top officials of Virginia-Carolina Chemical Corp. in Bartow, March 14.

While admitting that the project is definitely in the experimentation stage at this time V-C officials reason that in soil already rich in phosphate and nitrogen citrus trees should develop rapidly. In any event the company has already set out 600 trees in the first such clearing near Bartow, and are already clearing off other plots in their various mined out phosphate lands in other sections of Polk county.

Leroy W. Harris, administrative assistant to President and chairman of the board, J. P. Potter, explained to a crowd of about 100 persons that the experiment was decided on after it was noticed that the heaped-up overburden dams supported a "lush growth" of hairy indigo.

This plant, a legume, is used by many citrus growers as a cover crop.

Legumes, Harris noted, take nitrogen from the air and put it into the soil.

While jet planes from Bartow Air Base whistled overhead on routine training flights. Harris pointed out that trees planted on top of one of the phosphate mounds, were set out only 15 feet apart, rather than the usual 25 feet.

"Our purpose is to produce a fruitbearing canopy as rapidly as possible," he explained. "Later on, if it should be necessary to thin out the rows, every other tree can be removed."

The peaked mounds of overburden — soil stripped away to uncover the phosphate matrix — long have been a bone of contention in this area. To complaints that the mounds are unsightly and leave the land unfit for use, phosphate men have replied that pushing the banks back into the pits would be impossibly expensive.

Partly Leveled

In the V-C project, bulldozers were used to knock the top off a stretch of a dam, leaving a flat area about 30

feet wide and several hundred feet iong. In an adjoining five-acre area, a number of smaller banks at a lower level were flattened to provide a grove 1-lot punctuated by shallow canals.

William J. Menear, fathered the plan, and is most enthusiastic over its potentialities.

Bystanders remarked that if the project pans out, the company will more than recover the cost of leveling the land from the sale of fruit in a few years, in addition to converting the wild-looking terrain into a glossy green grove.

An additional two acres will be given similar treatment, according to plans announced by Harris, and another 150 trees will be planted there.

Valencia Oranges

Harris said that Valencia oranges on rough lemon root stock have been planted in the heavy clay-type soil. Sizeable amounts of iron and aluminum phosphate are present, and company officials expect fertilization

(Continued on page 20)

New Grove in The Making



Dr. Paul B. Sears, V-C agronomist (left) and Land Mgr. W. J. Menear, kneel beside one of the fledgling citrus trees as they explain some of the technical aspects of the project to, from the left, Atty. B. C. Wilson, President J. P. Potter, Polk County Farm. Agent W. Paul Hayman, Mgr. Hugh L. Pasco, Sen. Spessard L. Holland, Citrusman Frank Holland and V-C Director John S. Battle, former governor of Virginia, and a member of the U. S. Civil Rights Commission.



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Bloom Conditions Reported By Rutledge For Citrus Counties

Early and mid-season orange blooms were reported "spotty" in a current survey of Florida's citrus crop condition, released recently by Robert W. Rutledge, Florida Citrus Mutual general manager.

The 21-county report, compiled by Mutual's field representatives, is a "representative sampling and not all inclusive," Rutledge said.

He said it was still too early to



ROBT. W. RUTLEDGE Mutual's General Manager

determine whether this spotty conditon is any indication of the possible size of next season's early and midseason orange crop.

Citrus trees are showing excellent recovery from last winter's freezes, with many trees having abundant new growth, he said.

Rutledge said Mutual's field men report Valencia bloom "excellent."

Volume movement of Valencias this season is expected in about three weeks, Rutledge continued.

Excerpts from the report by coun-

Hardee— Moisture conditions are excellent with trees showing abundant new growth. Early and midseason orange bloom is spotty, but Valencias are showing excellent bloom. Harvesting of early and midseason oranges should by completed by March 15, with volume movement of Valencias possible by April 1.

Lake — Groves in excellent condition with much new growth. Duncan grapefruit showing light bloom indicating an off-year production. Last of the midseason oranges are being harvested with some Valencias moving to fresh, chilled juice and single strength outlets.

Citrus and Sumter — Good growing conditions through the winter have resulted in excellent tree recovery from last season's freezes. Bloom on Parson Brown and Pineapple varieties generally light and scattered with some in fair bloom. Valencia

Orange, Seminole and Osceola — Good movement of Valencias to fresh, single strength and chilled juice outlets with few going into concentrate. Most of these oranges are from young trees.

Hillsborough — Valencia bloom is heavy and strong. Early and midseason bloom is scattered with some groves showing no bloom. Moisture conditions are excellent. No volume movement of Valencias to concentrators before April 15.

Volusia nad Putnam — Navel and Valencia oranges showing good bloom in favorable locations. Older trees are not blooming, but have good new growth. All midseasons are making ratio requirements, and harvesting should be completed by March 15.

Marion — Trees in excellent condition generally with good new growth. Valencias blooming good, while early and midseason trees show spotty

Manatee and Sarasota — Early, midseason oranges and Duncan grape-fruit showing spotty bloom, Valencia crop is light with movement not expected before April.

Lee and Hendry — All varieties of oranges showing heavy bloom, also grapefruit. All midseason oranges have been picked with growers expecting movement of Valencias around April 10.

Highlands — Abundant new growth on practically all trees. Most varieties, except Duncan grapefruit, have a normal to heavy bloom. Most Valencias are making ratio for concentrate with growers thinking peak quality will be reached April 1 or before.

DeSoto — Many trees damaged by last winters' freezes are showing excellent recovery. Valencias showing heavy bloom with some early and midseason trees blooming light and spotty. Some growers feel that these trees may bloom between now and June.

Indian River — Valencias beginning to move through fresh outlets. Bloom good on Temple and Valencia oranges, but other varieties spotty.

Pasco and Hernando — Abundant new growth indicates that trees are spending themselves toward growth recovery rather than bloom.

Polk — Midseason and Duncan grapefruit trees have produced heavy vegetative growth but show no signs of bloom. Other trees are in excellent condition and are showing fine early bloom.

NEW CITRUS LAND PROJECT IN EXPERI-MENTAL STAGE

(Continued from page 18)

costs to be somewhat less than for groves planted on the usual sandy loam soil.

The rugged terrain is expected to protect trees against cold damage, Harris continued. The steeply sloping sides of the overburden mound will provide air drainage on cold nights, he said.

In addition, water in adjoining pits will help to moderate the temperature, besides providing water for irrigation and for mixing insecticide sprays.

Bermuda grass has been planted on the slopes to help prevent erosion. The top of the mound has been seeded with black rye to lessen windloss of soil.

Concrete is becoming increasingly popular among Florida farmers as a building material for farm structures.

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Program Annual Gulf Coast Citrus Institute

Fred P. Lawrence, of the Agricultural Extension Service, has announced the tentative program for the 14th Annual Gulf Coast Citrus Institute which will be held in the Agricultural Center in Dade City on Friday, April 24th.

W. H. Mathews will preside over the meeting which will open at 9:00 o'clock in the morning.

The tentative program is announced as follows:

Budwood Registration Program — Its Progress and Value: Gerald Norman, State Plant Board, Winter Haven.

New Materials for Scale and Mites: J. E. Brogden, Entomologist, Agricultural Extension Service, Gainesville.

Recess

Greasy Spot Disease and Its Control: Miss Francene Fisher, Mycologist, Lake Alfred Citrus Experiment Station.

Using The Mercott to Its Best Advantage: Dr. Paul Harding, Plant Physiologist, USDA, Orlando.

Noon

Heat Treatment for Eliminating Viruses: Dr. T. J. Grant, Plant Pathologist, USDA, Orlando.

The Expanding Citrus Industry: J. R. Graves, Chairman, Florida Citrus Commission.

Recess

Panel Discussion:

Moderator: Fred P. Lawrence, Citriculturist, Agricultural Extension Service.

Topic:

- 1. Can We Expand Our Acreage on the Remaining Soil Types?
- 2. Post Freeze Care of Citrus Groves.

Panel Members:

Dr. W. L. Spencer, Lake Alfred,

Warren O. Johnson, Frost Warning Service.

Jack McCown, Agricultural Extension Service.

Bob Clark, Production Manager, W. H. Clark Fruit Company,

Morton Howell, Production Manager, Pasco Packing Company.

FINDING THE BEST LEMON FOR FLORIDA . . A REPORT OF PROGRESS (Continued from Page 16)

extraction. A concentrate for lemonade that was acceptable, since it did not contain any detectable off-flavor, was prepared from concentrate Meyer lemon juice to which lemon oil of good quality had been added. Also, the objectionable flavor in sweetened Meyer lemon juice was masked when either folded oil of lemon or coldpressed oil, prepared from lemons other than the Meyer, was added to the sweetened juice; however, should the intensity of the off-flavor be very great, it might be impossible to mask it completely.

The 42 raw lemon juices and the 42 concentrates for lemonade containing the same folded lemon oil, were examined for microbiological content. The total plate counts were found to be very low for the lemon juices, ranging from 100 to 23,000 per milliliter on orange serum agar. The concentrates for lemonade, examined immediately after preparation and prior to freezing showed lower counts ranging from 100 to 5,700. Gas producing organisms, chiefly yeasts, which could cause fermentation if the lemon juices or concentrates were diluted with water, were found in some of the products. No coliform bacteria or streptococci were found in any of the lemon juice or concentrate

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7. United States Department of Agriculture, Agricultural Marketing Service, Washington, D. C. United States Standards for Grades of Frozen Concentrate for Lemonade. Effective February 1, 1958.

With heavier production of citrus fruits, supplies of fresh fruit should be larger in the first half of 1959 than they were a year earlier.

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Secy. Benson Makes Pertinent Comments In Recent Speeches

U. S. Secretary of Agriculture Ezra T. Benson in an address before the National Council of Farmer Cooperatives in New Orleans recently, stated that "the principles of freedom upon which this nation's progress is based are under attack both at home and abroad . . . it is time for all of us who believe in liberty to stand up and speak out." The growth of cooperatives, he says, "is based on freedom . . . Farmer cooperatives are FREE enterprises. They are a part of our private capitalistic system. They are democracy in action . . . Cooperatives are economically, socially and spiritually sound."

The meet the "challenge of the Space Age," the secretary says, we must have full strength in agriculture — an agriculture "that is prosperous, expanding, and free." But agriculture, he continues, "cannot thrive in a straightjacket of any kind."

He said the commodities that are in trouble today and that have been in trouble are those that "looked to supports and controls unrelated to market conditions, rather than to freedom and flexibility for their prosperity." He cites cotton, corn, rice, wheat, tobacco and peanuts in this connection. On the other hand, he says livestock, citrus and soybeans are examples of farm products which have stayed "free" and have expanded markets tremendously.

The secretary recalled that one of his first actions as secretary was to issue a statement of policy which said, "price supports which tend to prevent production shifts toward a balanced supply in terms of demand and which encourage uneconomic production and result in continuing heavy surpluses and subsidies should be avoided."

He said that "if farmers had had more freedom — and less interference from government — their production adjustment over the years would have been more realistic — farm markets would have been larger — farming efficiency would have increased still more — agriculture would be on a sounder basis."

He added that even the limited progress made toward more realistic price supports has cut costs to taxpayers by a billion dollars in 1958. By July 1, 1959, he says the government investment in surplus commodities will total about 8.8 billion, and the annual cost of storage and interest in government stocks will be a billion dollars. "This is fantastic and indefensible." He says that when the take-over from 1958 crops is completed, the government "will have acquired — in just six years — 25 million bales of cotton — 2.5 BILLION bushels of wheat — 2.7 BILLION bushels of corn."

The secretary, after referring to the close interdependence of all segments of the economy, brings several "rather important facts" to the attention of his audiences. The first fact is that "agriculture in general had a relatively good year in 1958." Net farm income, he says, reached \$13 billion, 20 percent more than in 1957. and the highest since 1953, Net income per farm was 23 percent above 1957 and the highest since 1951. Total income per person on farms. from all sources, was at an all-time high of \$1,027, about 41/2 percent above the old record of 1951.

The secretary said that the "productivity of the American farmer is growing much faster than the productivity of American workers in general." Output per man-hour in agriculture since 1950 has risen at an average rate of 4½ percent per year, compared with about 2 percent for non-agricultural industry.

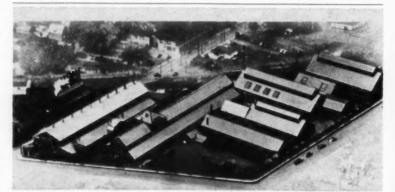
The "commodities that have stayed free are in the best shape today, He contrasts the expanding markets of livestock products and citrus with the difficulties encountered by cotton, corn, wheat, rice, peanuts and tobacco.

"Our price support programs, even though originally designed with small family farms and low income farm people in mind, have resulted in huge expenditures for a few farm productory produced primarily on a relatively few larger mechanized farms." He pointed out that two-fifths of the wheat farms have 90 percent of the wheat allotment acres; one-fourth of the cotton farms have three-fourths of the cotton acreage allotments, "Less than one-third of our farms account for by far the greater part of our price support outlays."

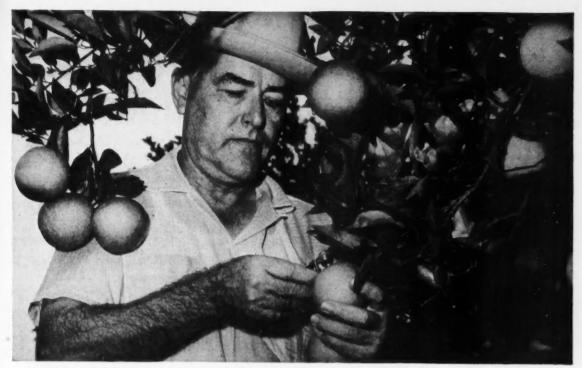
"We have some progress toward sounder farm programs, but it has been limited and painfully slow." The secretary said "we still have only a small part of the program we asked for and that farmers need. Our recommended program really has never been put into operation."

Stressing the wheat situation, he says that either controls on wheat producers must be made more rigorous than ever before — "more controls than Congress has ever been willing to impose — " or wheat producers must be given greater freedom to produce and compete.

The secretary said costly farm programs contribute "to unbalancing the budget." He said the trend of recent years is a threat to American freedom and calls on "everyone who believes in free enterprise rather than 'super-bureaucrats' to join the battle for freedom. I am convinced," he says, "that businessmen and their organizations should be as fully active politically as any other organization."



Shown above is a view of Hardie Manufacturing Company new location in Wilkes-Barre, Penn. Prior to the construction of this new plant the factory was located in Hudson, Mich.



His trees weathered a killing freeze!

Rainbow with MEM supplied the protective nutrients

The 1957-58 freeze was hard on citrus groves in the Spring Lake, Florida, area. But Cecil E. Ansley's 135-acre grove came through in good shape.

"My trees were from 40% to 90% defoliated after the freeze," he says. "But this year my trees have about 70% of a normal crop and tree growth has been wonderful."

Ansley credits this great recovery to the fact that he has been using Rainbow fertilizer with MEM for three years. He says the immediate response to Rainbow was outstanding. Like thousands of other growers, he likes the way it gives trees the extra boost needed for maximum yields and fruit quality . . . and keeps trees vigorous and healthy.

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Citrus Schools Being Held In 3 Counties In Florida...

Fred P. Lawrence, citriculturist, announces that three separate citrus schools will be held, which started on March 3. The schools will be held in Polk, Orange and Highlands counties and are open to anyone interesting in attending.

The programs of the three schools are presented herewith.

Polk County Every Tuesday Night at 7:30 P. M. March 3rd through June 2nd - Agricultural Center,.... Bartow, Florida

Lecture No. 6, April 7
Function of Nutrient Elements and
Their Effect on One Another

Do elements tend to build up in the soil? Can fruit quality be affected by any one element or combination of elements? Do trees luxury feed on one element at the expense of another? What is the role of and value of oranges in citrus fertilization?

Speaker Dr. C. D. Leonard, Associate Horticulturist, Citrus Experiment Station

Lecture No. 7, April 14
The Role of Calcium and Phosphate
in the Fertilizer Program

What importance do these elements have in citrus production and what conclusions may be drawn from recent research?

Speaker Dr. W. F. Spencer, Associate Soils Chemist, Citrus Experiment Station

Lecture No. 8, April 21
Fertilizer Practices and Recommendations

Learning to determine the needs of the grove—current fertilizer recommendations and how to apply them.

Speaker Jack T. McCowen, Assistant Citriculturist, Agricultural Extension Service

Lecture No. 9, April 28
Physiological and Maturity Sprays—
Foliar Feeding—Disease Control

The use of foliar sprays including major and minor elements and the use of special sprays to control scab, melanose, yellow spot and greasy spot.

Speaker Dr. Ed Deszyck, Horticulturist, Citrus Experiment Station

> Lecture No. 10, May 5 Citrus Mite Control

A discussion of seasonal cycles, history, etc. of the many mites that are harmful to Florida citrus— emphasis will be placed on the use of and competitive cost of some of the

newer miticides.

Speaker Dr. Roger Johnson, Entomologist, Citrus Experiment Station

> Lecture No. 11, May 12 Scale Control

A review of the many types of scales that feed on citrus—including the armored scales, soft scales, mealy bugs and also white flies and sooty mold.

Speaker W. L. Thompson, Entomologist, Citrus Experiment Station

Lecture No. 12, May 19 Some Aspects of Biological Control

If it were not for natural or biological control man would find it difficult to compete with insects, even with his present knowledge of chemicals and atomic weapons.

Speaker Dr. Martin Muma, Entomologist, Citrus Experiment Station

Lecture No. 13, May 26
Advantages of the Budwood Registration Program

The Florida registration program has been operating seven years—what outlook does it offer our prospective growers?

Speaker Gerald Norman, State Plant Board, Winter Haven, Fla.

Lecture No. 14, June 2 Some Considerations of the Number of Trees Per Acre

Spacing—estimating yields on interplanted groves which are progressively pruned back — the outlook through the first 40 years.

Speaker Zach Savage, Economist, Agricultural Experiment Station Orange County Every Tuesday Night at 7:30 P. M. Beginning on March 3 at new Agricultural Center

Lecture No. 6, April 7
Fertilizer Practices and Recommendations

Learning to recognize the needs of the tree—current fertilizer recommendations—how to apply them—

Speaker Jack T. McCown, Assistant Citriculturist, Agricultural Extension Service

Lecture No. 7, April 14
Physiological Sprays and Foliar
Feeding

Disease control-the use of foliar sprays including major and minor elements and the use of special sprays for scab, melanose, yellow spot and greasy spot control.

Speaker Fred P. Lawrence, Citriculturist, Agricultural Extension Service Lecture No. 8, April 21 Citrus Mite Control

A discussion of life cycles, conditions, etc. of the many mites that are harmful to Florida citrus. Emphasis will be placed on the use and comparative costs of some of the newer materials.

Speaker Dr. Herbert Spencer, Entomologist, USDA, Orlando

Lecture No. 9, April 28 Scale Control

A review of the many types of scale insects that feed on citrus trees and must be controlled—this to include armored scales — soft scales—mealy bugs, white fly and sooty mold. Emphasis will be placed on economic control and the use of some of the newer materials.

Speaker J. E. Brogdon, Entomologist, Agricultural Extension Service

Lecture No. 10, May 5 Biological Control

If it were not for natural or biological control civilized man would indeed find it difficult to compete with insects even with his present knowledge of poisons and atomic radiation.

Speaker Dr. Don Clancy, Entomologist, USDA, Lake Alfred

Lecture No. 11, May 12
The Lack of Fruitfulness in Some
Varieties

Some varieties are definitely alternate producers, some produce abundantly and still others seldom produce good crops of ample fruits. Speaker Dr. Al Krezdorn, Horticulturist, Lake Alfred

Lecture No. 12, May 19
Weather — Wind Machines and
Heaters

Do Florida growers understand and use the weather reports to their best advantage—Are we spending money needlessly on frost protection?

Speaker Warren O. Johnson, Meterologist, Lakeland

Lecture No. 13, May 26 What Do You Know About Your Business

Citrus production is a major enterprise-can records be used to put more dollars in the growers pocket —how?

Speaker Zach Savage, Economist, Agricultural Experiment Station Highlands County 7:30 P. M. on Monday Nights 126 Sebring High School.

Lecture No. 1, April 6 Learning to Read Citrus Leaves

A color slide review of deficiencies and toxicities of citrus with suggested

Speaker Fred P. Lawrence, Citri-Agricultural Extension culturist.

Lecture No. 2, April 13 Soil pH, Soil Amendments and Mixed Fertilizers

A discussion of the soil complex, base exchange, soil amendments, mixed fertilizers and their formula-

Speaker Granville C. Horn, Soils Agricultural Extension Service.

Lecture No. 3, April 20 The Elements Citrus Needs

A discussion of the elements known to be required by citrus under Florida conditions, and the role each element plays in fruit quality and crop production.

Speaker William H. Mathews, Assistant Horticulturist, Agricultural Extension Service

Lecture No. 4, April 27 Fertilizer Practices and Recommend-

Learning to recognize the needs of the tree. Current fertilizer recommendations. How to apply them.

Speaker Jack T. McCown, Assistant Citriculturist, Agricultural Extension Service

Lecture No. 5, May 4 Physiological Sprays and Disease Control

Foliar sprays including all elements - scab, melanose and greasy spot control.

Speaker Fred P. Lawrence, Citri-Agricultural Extension culturist, Service

Lecture No. 6, May 11 Citrus Insects

A color slide review for the identification of major, minor and beneficial insects and fungi on Florida citrus with life cycle and

Speaker J. E. Brogdon, Entomologist, Agricultural Extension Serv-

Lecture No. 7, May 18 Scales and Mites Affecting Florida Citrus and Their Control

Speaker Dr. Roger Johnson and W. L. Thompson, Entomologists, Citrus Experiment Station

Lecture No. 8, May 25

Spray Program A complete discussion of the 1959 Better Fruit Program with emphasis on some of the newer materials with comparative costs.

Speaker J. E. Brogdon, Entomologist, Agricultural Extension Service

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Producing Units of 1960 To Differ Much From Today's Farms

The following forecast was written by Spuds Johnson under the heading of "Rural Common Sense" and submitted by the bureau of cooperative Extension Work in Agriculture and Home Economics of the University of Florida.

What will farming be like 20 years from now? Editors of The Progressive Farmer have brainstormed, read, talked and made some highly intelligent guesses and come up with the following description of the farm of 1979 or 1980.

Well, by that time, "farm" won't be a big enough word to describe the food producing plant. "Food factory" will probably be more accurate. It will have a business office to schedule work, operations, etc. It will have air-borne equipment, remote controlled machines, near-perfect weatherized environment, and crops and animals adapted to its individual needs.

The biggest change will come in farm equipment. A typical grain harvest scene then will include a helicopter flying to the field, hovering over the harvester, and hooking onto a grain-filled plastic box the size of a small trailer. The helicopter takes it to the storage area where insecticides and a moisture condenser will be shot inside it. An air-, water-, and insectproof top will be put on. When marketed, the box will be handled "as is."

No longer will farmers be going 'round and 'round. Remote control machines or "automatic pilot" devices that raise or lower and guide will replace them. An experimental "robot" cultivator has already been developed.

Year-round air conditioning will be commonplace in low-cost farm buildings. More animals than now can be imagined will never go outside a building or touch the ground.

Hormones which stimulate or hold back plant growth will be widely

Meat producers will be able to guarantee the amount of lean, tenderness, protein content, and dressing percentage, of animals they market. Runts will be a thing of the past. Instead of thinking in terms of grass

Letter to The Editor

OUR SINCERE THANKS
TO BOB RUTLEDGE

FLORIDA CITRUS MUTUAL

February 19, 1959

Mr. S. Lloyd Frisbie, Editor "The Citrus Industry" Bartow, Florida

Dear Friend:

I wanted you to know that we realize that your publication is now entering its fortieth year of service to the Florida citrus industry. Not only do we recognize the fine service that you have rendered but we congratulate you for the clear-cut policies and worthwhile reporting which have characterized "The Citrus Industry" from its beginning.

This is a great industry with a bright future. It is made up of people with dedication to ideals and with imagination to deal with temporary problems that may arise. You and your people certainly fall in that category in my book.

And so, my sincere congratulations as you enter into another era of service. May the next forty years be even brighter, happier and more prosperous for you and yours.

With all good regards.

Most Cordially,

Bok

ROBERT W. RUTLEDGE General Manager

or hay alone, we'll be making celulose, one of the key ingredients in low-cost livestock feeding.

There is an excellent chance that 20 years from now, animal producers will be able to decide before breeding whether females will produce all males or females or a certain percentage different from Mother Nature

Forms in which food products will

reach consumers will be vastly different. Atomic energy will greatly change handling of food products. If scientists are successful in irradiating food to prevent spoilage, refrigeration will largely be unnecessary.

The same type of folks will be farming 20 years from now. Farmers with backbone, imagination, and get-up and go will be doing fine as food factory managers, with a lot more leisure.

USDA Sees Need For Survey of Consumer Preferences...

A national survey of consumer preferences in citrus and subtropical fruits is needed to help producers and handlers grow and deliver the kinds of fruits customers want, according to the USDA's Citrus and Subtropical Fruit Research and Marketing Advisory Committee, which held its annual meeting in Riverside, Calif., Feb. 23-26.

Information is needed on what factors of fruit appearance and quality are considered relatively important in the minds of consumers, the committee said.

Two research proposals designed to help growers produce better fruit were given high priority ratings by committee members. The first calls for re-valuation of citrus rootstocks. Earlier studies have shown that the quality of citrus fruit, the vigor and productivity of trees, and resistance to disease are strongly influenced by the quality of starting stock.

The second proposal is for breeding research aimed at lengthening the season for fresh fruit and processing in all citrus areas. Earlier grapefruit are needed in all production areas. Florida also needs earlier oranges, and California needs an orange to fill the gap between the end of the Valencia harvest and the start of the navel harvest.

Basic research on chemical constituents is the first need to extend utilization of citrus and subtropical fruits, the committee agreed. This research should include a survey of such important constituents as carotenoids, enzymes, flavonoids, nitrogen compounds, coumarins, hydrocarbons, terpenes, organic acids, and tannins. Also needed are accurate new physical and chemical methods of testing fruit processing quality factors.

In addition to the consumer preference survey, research needed to improve the marketing of citrus and subtropical fruits includes study of the postharvest physiology of fruit and an economic analysis of the lemon industry, the committee said.

The committee also approved a proposal to improve the market grade standards of citrus fruit products and to adopt methods and equipment that facilitate more uniform interpretation of the standards.

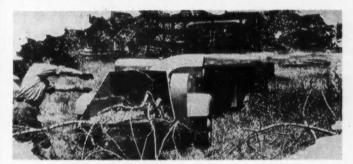
Established under the Research and Marketing Act of 1946, the committee is made up of national leaders from the citrus and subtropical fruit industry. Its detailed recommendations for research to be undertaken by USDA will be submitted formally to the Department within the next few weeks. Copies are available from the committee's executive secretary, Dr. Roy Magruder, Office of the Administrator, Agricultural Research Service, USDA, Washington 25.

Marvin H. Walker, general manager of the Florida Citrus Canners Cooperative, Lake Wales, and committee chairman, presided.

Other members attending were: N. L. Allen, president of General Industries, Inc., New York; A. L. Chand-

ler, executive vice president of Pure Gold, Inc., Redlands, Cal.; Horace Etchison, president of McAssen Fruit and Vegetable Co., McAllen, Tax.; W. M. Fifield, Provost for Agriculture, University of Florida, Gainesville; John T. Lesley, general manager of the Florida Citrus Exchange, Tampa; T. A. Lombard, president of Rancho Sespe, Fillmore, Cal.; Marcel Lussier, Kings Super Market, Inc., Detroit; M. W. Held, manager of the Pride O'-Texas Citrus Assn., Mission; Lewis H. Moore, president of the Moore Canning Co., McAllen, Tex.; P. S. Twombly, general manager of Golden Citrus Juices, Inc., Fullerton, Calif.

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Citrus In California

In a recent letter to members of Waverly Growers Cooperative, President W. C. Pedersen, has the following comments to make in reference to citrus in California.

The California citrus deal is not quite as old as ours in Florida, but it does date back to the eighteenth century when Spanish missionaries established the first citrus trees around the missions.

Recently we have been hearing that many of California's orange groves have been "budded" over to bungalows and have gone out of production. It is true that sub-divisions have replaced many old groves that were located near towns, but new groves are being planted that may equal the acreage that has disappeared.

New plantings on a large scale have been made in the central and southern part of California. These new groves now amount to about 20,000 acres of trees... not equal to Florida's young plantings, but still quite a sizeable acreage, and ten times the amount that Waverly has planted in the last three years,

California, like Florida, is expanding their new culture techniques to produce more fruit per acre. It looks like their new plantings will continue for some time as nursery stock is sold out for several years ahead in almost every county. In 1956 California's total citrus acreage was estimated to be 229,900 acres. This was down from 312,700 acres ten years before.

However, their production at that time was off only about one-sixth. This was due to the fact that groves taken out by sub-divisions were old and not good producers. They were probably let go because they planned on selling them for developments.

Many of the new plantings have been to Navel oranges in the San Joaquin Valley in central California. This area produces larger size fruit that ripens early for the Christmas and mid-winter trade. About 6,000 acres of new trees have been planted in Ventura County, 2,000 in Santa Barbara County, and 1,000 in San Diego County.

Some grapefruit trees have also been planted in the desert, and a few tangerine trees in Coachella Valley. Last year California growers got extremely high prices for their fruit, which has further encouraged new plantings. California's crop of oranges last year was very light . . . only 23-100,000 boxes . . . and this, coupled with Florida's freeze damage, made their fresh fruit sales reach record peaks. This year the estimate for California oranges is 36,000,000 boxes . . . Florida's 83,000,000. California growers must rely on the fresh fruit market for the profitable sale of their oranges.

Processors have long ago realized that they were up against a tough proposition when it came to competing with Florida's processed products. Florida's production costs are so much lower than California's that Florida-processed products find a ready market right in California itself.

Florida frozen orange concentrate dominates the orange concentrate sales in San Francisco area. The large variety and quantity of Florida canned products also aids Florida in distribution. While California has a large market for its fresh fruit on the West Coast, it finds the long freight hauls to eastern populated areas very expensive.



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In the thickest, heavy "shouldered" citrus foliage, or at the tops of large trees, you'll get thorough spray coverage with Speed Sprayer's new grove oscillating volute attachment. The oscillating blades direct the air stream in an up and down motion that causes the foliage to rise and fall. This foliage movement opens up the branches to provide top penetration and through-the-tree coverage never before possible. The volute may be purchased for either right or left discharge. Ask your Speed Sprayer representative to demonstrate the new volute attachment on the Speed Sprayer sized to fit your needs.

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Division of Food Machinery and Chemical Corporation

Citrus Organizations Urge Continuation of Per Box Tax

At a recent meeting of the legislative committees of the Florida Citrus Commission and Florida Citrus Mutual, the members agreed that the present per box tax on citrus fruits should be continued for another four years at their present status.

Since by the year 1961 most citrus authorities anticipate bumper crops of oranges and grapefruit it was the sense of the committees that adequate funds for the proper advertising of Florida's citrus crops could only be provided through the continuation of the present per box assessments. Many members voiced the sentiment that it was entirely probable that a 100,000,000 box crop of oranges could well be available for market from Florida by the year 1961.

The advance our Florida citrus industry has made since the Florida Citrus Commission came into being, is next to being miraculous. Even the development of frozen orange concentrate was financed by taxes collected on citrus fruit for the Florida Citrus Commission.

With hundred-million-box crops of oranges in prospect in the near future, if there were no Florida Citrus Commission to regulate and advertise, the supply would be so great, the demand so poor, and the quality of product so bad, that both growers and processors would soon be in the poorhouse.

Next spring the Florida Legislature will have to decide whether to continue the present taxes, increase them, or cut out some of them. Today there is a \$.03 per box continuing tax on oranges, plus an additional \$.02 a box tax enacted by the last Legislature for two years, that must be voted upon favorably again this year if it is to be extended beyond the present season. The total tax per box on oranges today is \$.05; on grapefruit there is a continuing tax of \$.04 per box, and a tax of \$.02 that must also be reinstated by vote of the Legislature if it is to be continued after this year.

There is a provision in the \$.02 a box temporary tax law on grape-fruit that provides for \$100,000 to be set aside for the purpose of paying \$.01 a box to private industry for each \$.02 per box spent in advertising of private brands of grape-

fruit. There have never been more than four packers in the State that have taken advantage of this "gimmick", and the amount turned over by the Commission to these private advertisers has never exceeded \$40,000.

Last year the total amount paid private packers was about \$35,000, and one operator received about 75% of the money. There is a lot of criticism over the use of public funds to advertise private brands. Some feel that this part of the law should be termed unconstitutional and done away with. If it is not, there may be a chance the whole advertising law that has proved to be so beneficial in the past might be put in jeopardy.

There now is a continuing tangerine tax of \$.05 a box, and it is supplemented by money spent by the Florida Tangerine Cooperative, which does not receive a \$.01 a box payment from tax money.

There are quite a few growers

who favor making a continuing tax that would provide \$.06 a box on all oranges, grapefruit and tangerines. The Sunkist organization of California has recently increased their tax \$.01½ for 1-2/5 bushel box making their total \$.06.

The next meeting of the Legislature will have to decide what our future citrus fruit taxes will be, and we hope that they will not reduce the present tax with prospects of such large crops in view in the near future. The Florida Citrus Mutual will take a stand on what their 9,000 grower members believe to be the best for the Florida citrus industry.

FERTILIZE ITALIAN RYE

Gainesville, Fla.—Italian rye or other winter temporary grasses planted six weeks or two months ago will need a little more fertilizer now to keep them growing, says Ralph White, assistant horticulturist with the Agricultural Extension Service. Apply 3 pounds of ammonium nitrate per 1,000 square feet of lawn to keep your out-door carpet green, he says.

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On Matters

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Citrus Being Shipped In Smaller Boxes

Smaller boxes are carrying proportionately more Florida citrus fruit to the fresh market this season than last, indicating that the swing toward the smaller-sized container is stronger than ever.

Up to Dec. 1 this season, six of every 10 oranges and grapefruit went to the fresh fruit market in the half-size or four-fifths bushel container, compared with about four out of 10 least season to the same date.

Total fresh fruit shipments so far this season in all types of containers have been substantially below last year. This is due to the late start of harvesting, with maturity delayed by last winter's freezes.

Figures on the container usage were released here today by Warren E. Savant, managing director of the Citrus Container Institute. They are based on latest figures available from the state inspection service.

"Half-boxes accounted for 60 percent of the shipments of fresh oranges and grapefruit, excluding bulk and bagged fruit, in November and also for the period starting Sept. 1 to Dec. 1, Savant said. "This compares with 45 percent in November, 1957, and 41 percent for the Sept. 1 to Dec. 1 period in 1957."

Corrugated half-box cartons carried 31 percent of the fresh oranges and grapefruit shipments in November, Savant reported, compared with 23 percent for the same month last season. This excluded bulk and bagged shipments

Wirebound half-boxes carried 29 percent of these shipments in November this season, he said, compared with 22 percent in November, 1957.

The other 40 percent of the season's orange and grapefruit shipments to Dec. 1 were moved in the standard 1-3/5 bushels wirebound-box.

The Florida Citrus Commission will conduct a poll of Florida shippers and northern market handlers

Florida Fruit And Vegetable Association To Meet

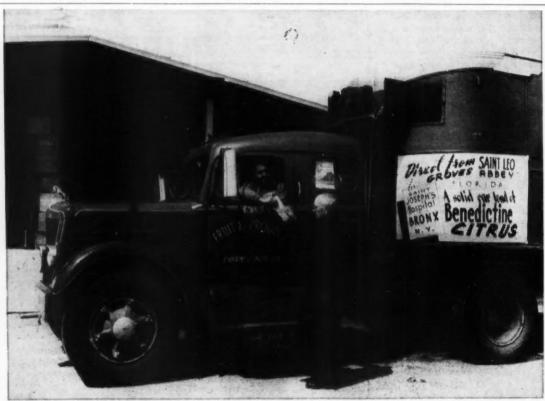
The 16th Annual Convention of the Florida Fruit and Vegetable Association will be held at Hotel Fontainebleau, Miami Beach, September 23-25, 1959, according to an announcement by J. P. Harllee, Jr., Palmetto, who will again serve as general convention chairman.

"The Association's Board of Directors voted unanimously to return to the Fontainebleau for the fifth consecutive year - the tenth consecutive meeting in the Miami Beach area," Harllee explained.

"Upwards of 1500 growers, shippers and handlers of Florida fruits and vegetables, representatives of government, educational instutitions and other allied interests attend this annual event," he concluded.

Florida Fruit and Vegetable Association headquarters is located in Orlando.

in April to determine if sufficient sentiment exists to declare the fourfifths bushel unit the industry's standard container.



Saint Leo — Brother Oblate Jack N. Corham, manager of Saint Leo Abbey citrus packing plant office, hands waybill to driver Ruben Budkofsky, as he sets off for Saint Joseph's Hospital, Bronx, N. Y., with 18 tons of Abbey tree ripened grapefruit and temple oranges.

Florida Supreme Court Rules Trees May Be Destroyed

The Florida Supreme Court ruled last Wednesday the state had authority to destroy citrus trees to combat spreading decline, but knocked out the \$1000 per acre ceiling on compensation to be paid growers for loss of their trees.

The court also held that the grower must be given a chance to obtain a court ruling on the necessity for destroying his trees and the amount of damage to be paid him before his trees are uprooted.

The court also held that consideration must be given to the commercial value of infested as well as healthy trees uprooted.:

Assistant Atty. Gen. Ralph Odum, legal adviser to the State Plant Board, said the court ruling complicates administration of the pull and treat eradication program.

He said the lifting of the \$1000 an acre ceiling might boost the costs to an impractical level and limit the program to those growers who voluntarily permit their trees to be pulled and make no demand for compensation.

Under the 1957 law developed after the State Supreme Court had ruled that growers must be compensated for healthy trees destroyed, the plant board was given specific authority to pull trees in an infested grove over opposition of the owner.

In compliance with the earlier Supreme Court ruling, the legislature provided for compensation for the grove owner, but limited it to healthy trees and imposed the \$1000 an acre ceiling.

Florida Per Acre Income Tops California

A tabulation of per acre returns for Florida and California oranges shows Florida orange income per acre to be greater than California's, Robert W. Rutledge, Florida Citrus Mutual general manager, said today.

"For the past 10-year-period, on the average, Florida grower received per acre returns amounting to \$168.00 on oranges, while his competitor in California has received an average per acre return of \$85.00 in the same period." Rutledge said.

The record for the five-yearperiod ending with 1956-57 shows that the Florida grower received an average of \$177.00 per acre for his orange crop compared to the California grower's average of \$118.00 per acre for the same period.

Rutledge estimates for the 1958-59 season Florida growers will average \$325.00 per acre for oranges and the California grower will receive \$225.00 per acre.

Rutledge said allowances have been made for cultural costs in the tabulation of the above figures.

"The Florida orange grower has met the challenge of maintaining marketing outlets in a healthy condition so that his net returns per acre for his crop will not suffer from changes of buying habits of the U. S. consumer," Rutledge said.

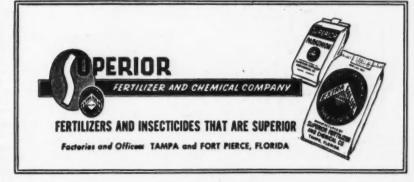
Career opportunities in agriculture are limitless. Don't let anyone sell you short on the future of agriculture in this country. However, with cost-price squeezes and new forms of competition affecting farm income, and with farmers facing loss of control over their operations through contract farming and economic integration, it behooves youth to learn the intricacies of farm business.—J. K. Stern

Conservation is more than conserving — it is wise use. Conservation is everybody's business and should be practiced as such. Man's very existence is dependent upon soil and water, which produces all he eats and drinks and many of the things he uses for clothing and shelter. These are basic natural resources which we can either waste or safeguard.



If you're healthy, you'll probably live longer because as it's said, "mounce of prevention is worth a pound of cure." If you're nervous, tired, rundown or stiff from rheumatism and arthritis, you can find relief as thousands of others have. You'll find the best at The Majestle where you can go from your room to the bathbouse in robe and alippers. Here you will find specialists who know their business—experienced attendants and masseurs for the men and masseures for the ladies—all licensed in accordance with the regulations under the Director of the Nat'l Park Service, U. S. Dep't of the Interior.





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HIGHLANDS AND POLK

R. E. Lassiter, Jr., P. O. Box 1304 Winter Haven, Fla.

Rainfall in the area is well above normal for this time of year. This has helped in bringing about a beautiful and luxurious growth to the trees this Spring. We have been experiencing an excellent bloom on many of the Valencias. However, the bloom has been slight on some grapefruit. Early and mid-season oranges. Lately, some of these blocks which did not have bloom earlier have been blooming fairly well.

If the first application of fertilizer to the young trees has not already been applied, this should be done as soon as possible. However, most of the young trees in this area have already been unbanked and fertilized.

The heavy rains are helping to bring about problems with melanose at this time. We are noticing quite a bit of melanose infestation on the new foliage.

Growers have not had a chance as yet to start their post-bloom sprays due to the rain and due to the fact that the bloom is not ready for this spray application. This spray should be applied after two-thirds of the petals have fallen from the blossoms. Copper should be used in these sprays to prevent any worse melanose infection than we are already experiencing.

HILLSBOROUGH PASCO AND SUMTER COUNTIES

C. W. Dean Gibsonton, Fla. Phone Tampa 40-2592

During this time of the month we find the weather much to our disliking. The rains have done a great deal of damage to our vegetable crops. The groves have benefited largely from the rains.

In a few groves, I have noticed an infestation of Texas and purple mites which can be controlled by the nutritional sprays with the additives for mites.

We are still wondering about

the blooms on some of our groves. It has been such a strange season that some of our growers are wondering if there will be a bloom on them.

I am hoping that you readers will be dried out by the time you read this and I hope the damage will be slight for you.

SOUTH POLK, HIGHLANDS, HARDEE AND DeSOTO COUNTIES

C. R. Wingfield Phone: Glandale 2-8181 Avon Park, Fla.

The month of February has been one with a variety of weather conditions, hot and cold, wet and dry and windy and calm. Either group could and has damaged the vegetable and melon crops. Frost was reported over a large portion of this area but was light. The cold winds are taking its toll. Vegetables will be delayed getting to market because of this inclement weather.

Citrus has come through in good condition and has been greatly benefited by the rains throughout the month. There has been a wonderful growth but in many groves the pineappde oranges and Duncan grapefruit are rather light with bloom. The bloom on early and late varieties appear good with the heavier bloom on Valencies

Growers have been busy setting trees where needed and making ready for the post bloom spray. Young trees have been fed and regular feeding during the Summer will be in the program. Rains have caused a lot of melanose and scab.

NORTH CENTRAL FLORIDA L. D. Geiger, Jr.,

L. D. Geiger, Jr., Phone STATE 7-3952 Leesburg, Fla.

Mid-March in this area finds the citrus growers winding up this fertilization period and preparing to start spraying. Most groves have been worked up very well and there is quite a bit of activity as young trees are being set. There is quite a bit of concern in this area due to the light bloom on early varieties of fruit. Most Valencias that I have seen seem to be blooming heavy.

NORTH CENTRAL FLORIDA

V. E. Bourland Winter Garden, Fla. Phone 107

We are having wonderful Spring weather at the present time with cool nights, had a food rain Thursday 12th, which made everything look fresh and green. Most all trees except early and seedlings have a good bloom, these early varieties may have more than shows up to be at the present time, as all trees have a wonderful new growth. Most all midseason oranges are picked, and seems that everybody is picking grapefruit now. Some Valencies are moving off young trees.

The melon growers have had a bad time with high winds, and the cold snap. Most of the pastures got nipped with some frost.

SOUTH HILLSBOROUGH, MANA-TEE AND SARASOTA COUNTIES

P. O. Box 365, Sarasota, Fla. Phone Fulton 8-2611

When I asked some of the big citrus shots why some groves have bloomed heavily on the old wood this Spring, and others put out big flushes of new growth with very little bloom, I just received pained looks — and replies more or less to the effect of "you tell me!"

However, be the why whatever it is, that's the way the bloom went in this section. Even trees in the same grove or block showed this sharp variation. Personally I think it can be laid to the effects of the low temperatures of last winter. That would be the obvious factor.

After peering into many of the big growth flushes I find a lot of hidden bloom, both on the old wood and the new — so no doubt we will have our next citrus crop as usual. We always do, and it is usually one size larger than the one before!

That good Lyons Fertilizer will be no small factor in achieving this much wished-for goal.

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Uncle Bill Says:

They is one thing fer sure, us growers never kin complain that they ain't no variety in our business...last year we was plagued with freezes... we bin through periods of drought 'n pesky pests that bothered our crops 'n jist recently we've had more rain in most parts of Florida than we needed, so it might well be said they ain't many dull moments in the life of a Florida grower.

Yet with it all, as we've said before, they is mighty few businesses which offers any better prospects fer profit in the long run than are to be found in the citrus producin' business . . . 'n if it wasn't fer these various things already mentioned we'd probably be complain' about life bein' too dull fer any use.

A good doctor has to keep studyin' the new remedjes which is bein' found to provide cures fer various ailments . . . a good lawyer has to keep up with all the new laws and to be familiar with the older ones . . . a teacher has got to keep step with the new courses and methods of trainin' to teach our kids . . . so us Florida growers has got to keep informed as to the latest and most effective production methods they is in order to raise the right sort of crops that will appeal to the consumers.

It is this need fer keepin' up with modern methods that keeps us from growin' stale . . . and sort of challenges us to produce the biggest possible crops of the very finest quality . . . and fer those of us who has been usin' Lyons Fertilizers we know the best method to accomplish these things, fer Lyons Fertilizers has long been noted fer Producin' Maximum Crops of Finest Quality!

Grades-Standards System Seen Boom To Nurserymen

The system of grades and standards for nursery stock which rapidly is gaining favor in the state is likely to boom Florida's nursery industry into one of the most progressive in the nation.

Nurserymen who devised the program and those who have studied its merits firmly believe the industry will take a giant stride forward by adopting the plan.

The Grades and Standards Program represents the first concerted effort to bring uniformity to the state industry. In the past, the purchase of one variety of plant at a dozen different nurseries could result in a dozen different sizes, shapes and prices. By following the dictates of the Grades and Standards Program, a nursery in south Florida now can offer the same plant in size and shape that would be available at another nursery hundreds of miles away.

Nurserymen, Buyers Benefit

This is certain to prove of particular benefit to nurserymen and buyer.

For the nurseryman, there would be the incentive of a better price for better quality plants. The producer of an especially fine plant would be assured his stock would command a better price than stock produced with less attention to details.

The buyer, naturally, would be guaranteed a better plant for his money. In becoming acquainted with the grades and standards scale, the buyer would know exactly what he was purchasing.

To familiarize the industry and the general public with the program, the State Plant Board has produced a comprehensive digest of the plan which will appear shortly as a lose-leaf publication with pictorial ilustrations of the grades and standards for a number of shrubs and trees. Copies are to be sent to all nurserymen, stock dealers and agents.

The idea of uniform stock from all Florida nurseries originated with a group of progressive nurserymen. Aware of the benefits of such a program to the industry, these growers also recognized the value of a system that would provide out-of-state buyers with a healthy plant of uniform size and shape, regardless of point of origin.

'The idea was passed along to the State Plant Board with the request for a practical and practicable program. The publication now in the hands of the printers is the result and represents endless hours of research and study. Nurserymen who

have seen proofs of the book agree that the Grades and Standards Program is one of the most progressive plans ever offered the nursery industry.

Classified Ads

SUPERIOR CITRUS TREES—Grown on virgin land, certified nematode-free. Protected by wind machines and fuel for assured delivery. Most varieties available for June and Fall planting. Orders accepted now for REGISTERED PSOROSIS-FREE stock for Fall and Winter delivery. Will bud REGISTERED stock on order for 1960 and later delivery. For further information and quotations call GLendale 2-7541 or write WARD'S NURSERY, INC., BOX 846 — AVON PARK, FLA.

INDIAN RIVER GROVES — Any size of your request — No freeze dam-

> LEVERE MONTGOMERY, REALTOR 2010 ORANGE AVENUE FT. PIERCE, FLA. PH. HO 1-7990 or HO 1-3666

Completely reconditioned CASE GROVE TRACTOR . . . like new! Fully guaranteed. \$1500. Call or write POUNDS TRACTOR COMPANY, Winter Haven. Phone CYpress 3-3159.

FOR YOUR FUTURE Citrus Plantings, we have certified stock of sour orange, cleo and lemon root. Varieties and prices quoted on request. Crescent Farms, Box 890, Bradenton, Florida. Phone 2-3821 or 2-7004.

CITRUS SEED — New crop of sour orange, sweet orange and Cleopatra Mandarin seed. Write for prices, stating amount needed.

WARD'S NURSERY, INC., BOX 846 — AVON PARK, FLA.

LEAF ANALYSIS: Analysis for nitrogen, phosphorus, potassium, calcium, magnesium, boron, manganese, iron, copper, zinc and molybdemum . \$15. Write for details to Dr. Wolf's Agric. Labs. 2620 Taylor St.. Hollywood, Florida.

YOUR GROVE DESERVES THE VERY BEST — Personally selected buds on large lemon root. Grown on high sand land to exacting standards for old time hardiness with today's high production. JIM CRUMP CITRUS NURSERY, Phone CYpress 3-2958, 551 Avenue O. SE., Winter Haven, Florida.

FOR SALE — 20 ft. FMC Parker Citrus Sizer. Excellent condition. \$500.00. Midway Groves, Inc., Route 2, Box 288, Sarasota, Fla.

EXCELLENT 3/4 inch Valencia and Pineaaple Trees on rough lemon root. Inspection certificate with each sale. Call Dick Durden, at Frontier 5-2891, Bowling Green, or Owen Bissett at CYpress 3-1337, Winter Haven.

USDA Buys Canned Grapefruit Sections For School Lunches

The U. S. Department of Agriculture has announced purchase of \$1.5 million worth of canned grapefruit sections.

The purchase consisted of 246,-000 cases (12 No. 3 cylinder cans) and 70,000 cases (24 No. 2 cans) of grapefruit sections, and was made with funds appropriated under the National School Lunch Act.

This purchase is the result of offers recived in response to USDA's announcement of Nov. 20 (press release USDA 3275-58). The grapefruit sections were shipped between Dec. 29, 1958, and Feb. 28, 1959, to schools for use in the National School Lunch Program.

Discounts for prompt payment (as indicated below) were taken into consideration in making awards. Details of awards follow:

Company and F.O.B. Point	Can Size	No. of Cases	Price Per Case
Adams Packing Assn., Inc.			
Auburndale, Fla.	No. 3 cyl.	20,000	\$4.99
Auburndale, Fla.	No. 3 cyl.	30,000	\$5.04
Bordo Products Co.			****
Winter Haven, Fla.	No. 3 cyl.	20,000	\$5.025 -less 1 1/4 9
Winter Haven, Fla.	No. 3 cyl.	20,000	\$5.075 -less 1 1/4 9
Winter Haven, Fla.	No. 3 cyl.	20,000	\$5.125 -less 1 1/4 9
Florida Citrus Canners			
Cooperative			
Lake Wales, Fla.	No. 3 cyl.	20,000	\$4.83
Lake Wales, Fla.	No. 3 cyl.	20,000	\$4.88
Lake Wales, Fla.	No. 3 cyl.	20,000	\$4.93
Lakeland Highlands			4
Canning Co.			
Highlands City, Fla.	No. 3 cyl.	20,000	\$5.10 -less 1 1/4 %
Highlands City, Fla.	No. 2	30,000	\$4.08 -less 1 1/4 %
Salada-Shirriff-Horsey, Inc.			41100 1000 17 /8 //
Plant City, Fla.	No. 2	40,000	84.04
Stokely-Van Camp, Inc.	2101 2	,	V
Tampa, Fla.	No. 3 cyl.	56,000	34.99



"ORTHO assures top market-quality grapefruit"

"We have had excellent control of scale and mites since we've been using ORTHO products," says Jim Dickinson, Production Manager, Wardlow Bros., Frostproof, Fla. (pictured above on left of ORTHO Fieldman Joe Murphy). "ORTHO assures us of top quality grapefruit for the fresh fruit market."

Leading Florida Citrus Growers acclaim ORTHO Field Service and products. Here's why:

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When you buy ORTHO products, all the personal, on-your-ground technical advice and services of your ORTHO Fieldman are provided gladly and without any extra charge. Too, with ORTHO, you're associated with the company that first developed highly refined petroleum oil sprays in the form of new type emulsions and ready-mixes. This scientific research and technical experience have made ORTHO Field Service and products the choice of Florida citrus growers for over 34 years.



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Orlando: Cliff Sutton • Orlando: John Nowell • Deland: Randall Williams • Plant City: Webster B. Carson

The Fruit You Produce Can Be No Better Than Your Trees

For a long, long time every grower has been aware of the fact that High Quality Fruit brought him better returns for his citrus crop than inferior fruit would bring.

And it is just as much a foregone conclusion that in order to raise High Quality Fruit in adequate volume it is necessary to have strong, healthy trees.

In order to have such trees Florida Growers have long since adopted the practice of seeing that their citrus trees were adequately and properly nourished by the application of high type fertilizer which has been designed to care for the requirements of each particular grove.

The fact that so large a number of the state's most successful growers have continued throughout the years to apply Lyons Fertilizers to their groves furnishes ample proof of the high quality of our fertilizers as is reflected in the exceptionally fine crops they produce.

In the event you have problems in cultural practices or in production we are prepared to help... our Field Service Men will gladly give every possible service and counsel to you. LYONS
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